IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

SKYLINE SOFTWARE SYSTEMS, INC., Plaintiff, v. KEYHOLE, INC., and GOOGLE, INC., Defendants.	CIVIL ACTION NO. 04-11129 DPW

DECLARATION OF PROFESSOR STEVEN K. FEINER, Ph.D. IN SUPPORT OF DEFENDANTS' OPPOSITION TO PLAINTIFF'S MOTION FOR PRELIMINARY INJUNCTION

[PUBLIC REDACTED VERSION]

[HIGHLY CONFIDENTIAL VERSION FILED UNDER SEAL PURSUANT TO DEFENDANTS' MOTION TO IMPOUND AND AGREED UPON RESTRICTIONS TO ACCESS AND USE]

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I, Steven K. Feiner, declare as follows:

1. I know the following information through my own personal knowledge, and if called and sworn as a witness, I could and would competently testify thereto.

2. My background and qualifications were previously described in Declaration of Professor Steven K. Feiner, Ph.D. in Support of Defendants' Responsive Claim Construction Brief, dated March 25, 2005, (Docket # 50) which I hereby fully incorporate by reference.

3. I have reviewed the Declaration of Michael T. Jones in Support of Defendants' Opposition to Plaintiff's Motion for Preliminary Injunction, dated February 2, 2006, (the "Jones Decl."); United States Patent No. 6,496,189 (the "'189 patent") and its relevant prosecution history; United States Patent No. 6,111,583 (the "'583 patent") and its relevant prosecution history; United States Patent No. 5,760,783 (the "'783 patent" or "Migdal"); Leclerc, Y. and Lau, S., "TerraVision: A Terrain Visualization System," SRI International, Menlo Park, California, Tech. Note No. 540, April 22, 1994 ("TerraVision"); and Cosman, M., "Global Terrain Texture: Lowering the Cost," *Proceedings of the 1994 Image VII Conference,* Tempe, Arizona: The Image Society, pp. 53-64 ("Cosman"). I understand the operation of Google Earth from the disclosures made in the Jones Decl.

4. Attached as Exhibit A to this Declaration is a true and correct copy of United States Patent No. 5,760,783, entitled "Method and System for Providing Texture Using a Selected Portion of a Texture Map," and filed November 6, 1995.

5. Attached as Exhibit B to this Declaration is true and correct copy of Leclerc, Y. and Lau, S., "TerraVision: A Terrain Visualization System," SRI International, Menlo Park, California, Tech. Note No. 540, April 22, 1994, obtained from SRI International's website at http://www.ai.sri.com/pubs/files/778.pdf.

6. Attached as Exhibit C to this Declaration are true and correct copies of (i) Agranov, G. and Gotsman, C., "Algorithms for rendering realistic terrain image sequences and their parallel implementation," *The Visual Computer*, vol. 11, pp. 455-464, 1995, obtained from http://www.cs.technion.ac.il/~gotsman/AmendedPubl/AlgorithmsForRender/AlgorithmsForRender.pdf , and (ii) Tiirney, B., Johnston, W., Herzog, H., Hoo, G., Jin, G., Lee, J., Chen, L., Rotem, D., "Distributed Parallel Data Storage Systems: A Scalable Approach to High Speed Image Servers," *Proceedings of the Second ACM International Conference on Multimedia*, San Francisco, CA, 1994, pp. 399–405, obtained from http://doi.acm.org/10.1145/192593.192709. I have included copies of these articles because they cite the TerraVision article and have publication dates preceding the filing date of the '582 patent, substantiating that the TerraVision article was publicly available before that time.

7. I have been informed of the parties' and the Court's proposed claim constructions as contained in Plaintiff Skyline Software System, Inc.'s Opening Claim Construction Brief (Docket # 46), Defendants' Responsive Claim Construction Brief (Docket # 49), Plaintiff Skyline Software Systems, Inc.'s Reply Memorandum on its Proposed Claim Construction (Docket # 54), Defendants' Surreply Brief Regarding Claim Construction (Docket # 58) and the transcript of the court hearing of April 27, 2005.

8. With respect to the '189 patent, my analysis herein is limited to the asserted claims, namely claims 1 and 12.

9. I have reviewed the opinion of Skyline's expert that "Based on my review of the publicly available information and my extensive experience in the mapping and GIS software fields, Defendants' Google Earth products perform in the same manner as described in the '189 Patent." Declaration of Terry Keating, Ph.D., ¶ 10 (Document # 65). While the '189 patent describes a method of providing 3D graphics from remotely obtained data, multiple methods of providing 3D graphics from remotely obtained data exist in the art. It is not possible to reasonably

conclude that "Google Earth products perform in the same manner as described in the '189 Patent" based on the publicly available information regarding Google Earth, namely the appearance of the product to the user when in operation and the sources cited by Skyline in Skyline's Memorandum in Support of Motion for Preliminary Injunction. One cannot deduce whether the Google Earth software operates according to the asserted claims simply by using the software and reading the publicly available information regarding Google Earth. Furthermore, the question of how the internal operation of one program compares with the internal operation of another program is not a mapping and GIS issue, even if the programs are used in mapping and GIS applications. The relevant area of expertise is rather computer science, and specifically computer graphics.

10. Google Earth does not practice the method of claim 1, as I discuss below.

11. Claim 1 discloses a method that requires the step of "*receiving **from** the renderer* one or more coordinates in the terrain along with indication of a respective resolution level." '189 patent at col. 16:32-34 (emphasis added). Under any of the constructions proposed by the parties or the Court, Google Earth does not meet this limitation. Google Earth [redacted] operate in a fundamentally different way than the method of claim 1. The method of claim 1 contemplates the renderer providing coordinate and resolution information to request a specific data block to draw. See, e.g., '189 patent at col. 4:15-17, 35-38; 9:35-38; ABSTRACT: 4-6.

[redacted]

[redacted] Accordingly, Google Earth does not meet the "receiving from the renderer" limitation of claim 1.

12. Under any of the proposed constructions of the term, [redacted] as claimed in the '189 patent. As discussed above, [redacted] does not meet the "renderer" limitation under Skyline's construction of the term. I understand from the claim construction briefing that Skyline's construction requires the claimed "renderer" to perform one or more of the steps of the recited method. [redacted]. The first two steps of the recited method require "receiving from the renderer one or more coordinates in the terrain along with indication of a respective resolution level" and "providing the renderer with a first data block." '189 patent at col. 16:32-38. [redacted]

13. The last element of the recited method requires "downloading from a remote server." '189 patent at col. 16:38-43. [redacted]

[redacted] Whether the Court construes "renderer" under Defendants' or Plaintiff's proposed constructions, Google Earth does not meet this element of claim 1.

14. Google Earth does not meet the "data blocks belonging to a hierarchical structure" limitation of claim 1 under any construction of the term. In the claim construction briefing, both Plaintiff and Defendants advocated a construction whereby each level of the hierarchical structure contains data blocks having a different resolution than blocks in the preceding level. While data in the patent is organized in successive levels of increasing resolution, [redacted]

15. [redacted].

16. 

17. The above distinctions apply with equal force to claim 12 because claim 12 is directed to an apparatus implementing the method of claim 1.

18. Based on my reliance on the operational description of Google Earth, as recited in the Jones Decl., it is my opinion that Google Earth does not infringe the asserted claims of the '189 patent.

19. It is important to note that my recitation of any particular difference or set of differences between claim 1 of the '189 patent and the Google Earth system does not imply that there are no other differences. To the contrary, because it is my understanding that an accused product does not infringe if even a single claim limitation is missing, I understand that my analysis of a claim may be concluded once a first difference or set of differences is identified, even though numerous differences between a claim and the Google Earth system may exist. It is therefore

possible that other differences exist in addition to those discussed herein.

20. I have reviewed the identified prior art of TerraVision, Migdal, and Cosman, and, as discussed below, the identified prior art raises substantial questions as to the validity of at least the asserted claims of the '189 patent.

21. There is a substantial question as to the novelty of at least the asserted claims of the '189 patent in light of TerraVision. Claim 1 recites the following limitation: "A method of providing data blocks describing three-dimensional terrain to a renderer." TerraVision in turn discloses: (i) "TerraVision is a system for visualizing terrain. That is, it allows a user to view, in real time, a synthetic recreation of a real landscape created from elevation data and a large number of aerial images of that landscape," p. 2, ¶1, (ii) "The basic idea is to create a multi-resolution representation of the terrain data (both the elevation and image data), divided into equal-sized elements called tiles. This way, only those tiles of the resolution required for a given viewpoint need to be retrieved from the database," p. 3, ¶ 3, and (iii) a "graphics station used to render the synthetic views," p. 3, ¶ 4. Claim 1 also recites the following limitation: "the data blocks belonging to a hierarchical structure which includes blocks at a plurality of different resolution levels." TerraVision in turn discloses: (i) "The basic idea is to create a multi-resolution representation of the terrain data (both the elevation and image data), divided into equal-sized elements called tiles," p.3, ¶ 3, (ii) "Each node of the quad-tree represents a volume in space defined by a square area in the (x, y) plane, and the minimum and maximum elevation within that area.... The four children of a node correspond to a subdivision of the square area into four parts, as illustrated in Figure 1," p. 9, ¶ 3, and (iii) "Each node in the quad-tree also represents a square grid of samples of the terrain functions, called elevation and color tiles. If we fix the number of samples per tile at all levels..., then each level of the quad-tree represents a level of a resolution pyramid. This is because the size of a node doubles from one level in the quad-tree to the next, while the number of samples remains constant. Therefore, the interval between samples doubles from one level to the next in the quad-tree, just as the interval between samples

doubles in the resolution pyramid," p. 10, ¶ 1. Claim 1 also recites the following limitation: "receiving from the renderer one or more coordinates in the terrain along with indication of a respective resolution level." TerraVision in turn discloses: (i) "A node in the quad-tree is identified by its position and level, denoted (m, n, q).... For all values of q, the lower left-hand corner of nodes (0, 0, q) is at (x, y) position (0,0).... Some assumptions required to maintain a simple relationship between nodes in the quad-tree and levels in the resolution pyramids are as follows. Note that q, the level number in the quad-tree, is not the same as the resolution number in the resolution pyramids. Item 6 [on page 11] defines the relationship between the two," p. 10, ¶¶ 3-4, and (ii) "Abstractly, the terrain is defined as elevation and color as a function of (x, y) coordinates on a plane," p. 4, ¶ 2. Claim 1 also recites the following limitation: "providing the renderer with a first data block which includes data corresponding to the one or more coordinates, from a local memory." TerraVision in turn discloses: (i) "Keeping a coarse resolution representation of the entire database in memory, plus a large cache of previously requested tiles, allows TerraVision to render a view of the terrain at all times," p. 3, ¶ 3, and (ii) "...some representation of the terrain can always be rendered, although perhaps at a coarser resolution than desired," p. 17, ¶1. Claim 1 also recites the following limitation: "downloading from a remote server." TerraVision in turn discloses: "The distinct advantage of the above approach is that the terrain database can be remote from the graphics station used to render the synthetic views," p. 3, ¶ 4. Claim 1 also recites the following limitation: "one or more additional data blocks at a resolution level higher than the resolution level of the first block which include data corresponding to the one or more coordinates if the provided block from the local memory is not at the indicated resolution level." TerraVision in turn discloses: (i) "the list of tiles to pre-fetch is naturally ordered from coarse to fine resolution tiles.... Consequently, if the user stops moving, this process will first prefetch all of the visible tiles at a given resolution before pre-fetching tiles at the next highest resolution," p. 19, ¶ 3, and (ii) "If the tile is not currently in memory, the coordinates of the tile are placed at the bottom of the list of tiles to pre-fetch," p. 18, ¶ 5.

22. There is a substantial question as to the nonobviousness of at least claims 1 and 12 of the '189 patent in light of Migdal and Cosman. Migdal, U.S. Patent No. 5,760,783, entitled "Method and System for Providing Texture Using a Selected Portion of a Texture Map," has a filing date of November 6, 1995, and was cited by the Examiner twice in rejecting key claims of the '189 patent. One of the named inventors of Migdal is Michael T. Jones, the Chief Technology Officer of Google Earth. Migdal shows many of the features of the '189 patent, including hierarchical structure of blocks at a plurality of different resolution levels (levels of detail), rendering three-dimensional terrain, downloading data blocks into a local memory, and using satellite data or aerial photographs. To overcome Migdal, the applicants successfully argued that the deficiency of Migdal was its failure to show the order of downloading additional data blocks where lower resolution blocks are downloaded before higher resolution blocks. The Examiner had noted that Migdal disclosed downloading the highest resolution first, but apparently allowed the claims for failure to find prior art where this order was reversed. Cosman, which was presented in June 1994 at the *IMAGE VII Conference* in Arizona, discloses downloading the lower resolution (level of detail) blocks first. Cosman states that, "Preferential paging of the lower LODs ensures a benign paging overload fallback--terrain would then be textured with a lower resolution version of the right texture." (Cosman, p. 62, ¶2). In other words, the system prefers to get lower level of detail blocks first, so that if it gets overloaded and cannot get the higher level of detail blocks needed for an image in a reasonable time, the terrain would then be textured with a lower resolution version of the correct texture. The motivation to combine Migdal and Cosman comes from a key concept in Cosman: downloading lower resolution data blocks first ensures that in the case of a paging overload, a lower resolution version is available and can be used. Cosman was also cited in the "Other Publications" section of Migdal.

I declare under penalty of perjury under the laws of the United States of America that, to the best of my knowledge, the foregoing is true and correct.

Dated: February 3, 2006

/s/ Steven K. Feiner, Ph.D.
Steven K. Feiner, Ph.D.